REMARKS

Claims 1, 2, 4, 5 7, 10 and 12 are pending.
All pending claims are rejected.
Claim 1 is amended.

Claim 1 amendment

Claim 1 is amended to further characterize the reverse phase polymer as a dispersion of polymer particles in oil. Support for this amendment may be found on page 8, line 6.

Applicants wish to stress that a reverse phase polymer as presently claimed means a dispersion of polymer particles in oil. This is the form of the reverse phase polymer which is added to the suspension.

Applicants wish to make sure that the examiner is not confusing the term "reverse phase" with a polymer so made (by reverse phase). Thus the claim limitations require the application of the reverse phase polymer to the suspension in the **form** of a dispersion of polymer particles in oil. The present claim would not encompass the addition to the suspension of a reverse phase polymer which has been pre-diluted so as to invert.

Claims 1 is further amended to require mixing in step c) with conventional mixing equipment and compression dewater in step d). Support for the amendments may be found on page 5, lines 30-31 and page 6, lines 5-7.

Applicants have also amended claim 1 to repair the antecedent basis for "the release polymer". To clarify applicants amends to refer to "the polymer released in step b)".

No new matter is added.

Informalities

Applicants have corrected the informalities on page 6, line 4 and line 24 as suggested by the examiner.

35 USC 103(a)

Claims 1, 2, 4, 5, 7, 10 and 12 are rejected under 35 USC 103(a) as being unpatentable over WO02/072482, Weir in view of Winn, US 6,447,687.

Examiner believes the reverse phase polymer added in the process of Weir would appear to invert in the suspension and release sufficient polymer to bring about flocculation, thickening, and cake formation as in the instant process, since the same polymer and amounts appear to be utilized to dewater the same types of aqueous suspensions.

Examiner agrees that the claims differ from Weir by reciting that the process includes producing a thickened suspension by the release of free water, mixing the fully inverted released polymer into and distributed throughout the thickened suspension and subjecting the thickened suspension to mechanical dewatering to form a cake.

Examiner believes Winn to disclose that it is known in the art to mix sewage sludge with a reverse phase emulsion and utilize a thickener to thicken sludge by removing a filtrate and dewater the thickened sludge to produce a cake. It appears to the examiner that the thickener utilized in Winn would mix and distribute the released polymeric flocculant from the reverse phase emulsion throughout the thickened suspension.

Applicants respectfully disagree:

Applicants submit that many inventions comprise combinations of old elements which are applied in a novel way to give improved results.

Applicants believe examiner has combined elements in the prior art to arrive at the present invention even though there is little direction from either reference alone or combined to apply all the elements in the specific way claimed. The fact that the elements exist and that the elements could be applied in the order claimed hardly provides motivation, direction or expectation of success to do so.

Weir does not suggest steps b) or c) . But examiner has found an additional reference, Winn which teaches the possibility of using a thickener in sludge treatment. Winn further teaches the possibility of using a reverse phase emulsion at any addition point.

However, Winn also teaches that the reverse phase emulsion is "usually activated in water before addition to the sludge, all in a conventional manner". See col. 7, lines 38-43. Therefore Winn is teaching the addition (if at all) of the reverse phase polymer in an inverted form, that is, not as a dispersion of polymer particles in oil but as an inverted polymer in water (the polymer is no longer in oil but is in aqueous solution usually in diluted form).

It is unclear if the examiner consider that "usually" means that the reverse-phase polymer also may not be activated in water before the addition to the sludge. The examiner may consider that this would equate to direct addition of the reverse-phase polymer. The applicants submit that this interpretation is pure speculation and has no basis in fact in the Winn disclosure.

It is more likely that Winn means activation in some other aqueous liquid other than pure water which is more in keeping with the context of the Winn (column 3, lines 41 to 43). Some or all of the water used in the activation can be part or all of the reject liquor recycle. In this context the reverse-phase polymer is usually inverted into mains water (effectively pure) or alternatively into the reject liquor recycle. In no way can direct addition of the reverse-phase polymer be considered conventional.

In order to arrive at the present claim limitations one skilled in the art would have to apply the reverse phase polymer of Weir as a polymer dispersion in oil, in the thickener described in Winn, mix using conventional mixing equipment then compression dewater.

The problem with this combination is Weir gives no hint as to incorporation of a separate thickening and mixing step followed by compression dewatering. While Winn discusses sewage sludge and makes a reference to the possibility of applying a reverse phase polymer, Winn only suggests that this reverse phase polymer be added in a conventional manner, that is "usually activated in water before addition to the sludge, all in a conventional manner". Thus one skilled in the art would need to apply the reverse phase (say from example 1 of Weir), treat the sewage sludge suspension and partially invert, followed by a thickening step such as in a thickener taught in Winn, wherein the remainder of the reverse phase inverts and is conventionally mixed then dewatered via compression. There is no direction from either Weir or Winn to arrive at this particular sequence of steps. The combination of elements from Weir and Winn as claimed is highly selective picking and choosing from the two references without any direction or motivation from either reference to make the particular selections.

Further, neither Weir nor Winn were aware of the clear advantages such steps offer.

Applicants invite the examiner to look at the results shown in Weir Tables 1, page 7 and Table 2, page 9. It is clear that simultaneous addition of an inverted reverse phase polymer and a reverse phase polymer (0.1% and 50% concentration compositions at different addition points to the sewage sludge) show marked improved filtration over single dosing of 0.1, 0.25 of inverted reverse phase polymers and 50 wt. % reverse phase concentrations. In fact, the dual addition in Weir is the limitation upon which the Weir invention relies.

One skilled in the art looking at Weir is directed to the use of simultaneous addition of both inverted reverse phase (dilute) and reverse phase (concentrated) in sewage sludge substrates because this shows much improved filtration.

However, the single addition of 50% reverse phase and 0.25% and 0.1% inverted phase polymer results in Weir are highly instructive especially when compared to the single addition of reverse phase polymer (dispersion of polymer particles in oil) as taught in experimental procedure A, data set 1 in the present application.

Examiner has opined that the process of Weir would appear to invert in the suspension and release sufficient polymer to bring about flocculation, thickening and cake formation as in the instant process, since the same polymers and amounts appear to be utilized to dewater the same types of aqueous suspension.

It is agreed that the polymers of Weir are similar as those presently exemplified. Weir exemplifies reverse phase emulsion copolymers of cationic acrylamides of an IV of 10 dl/g and 9/dl/g at 50% concentration (examples 1 and 2 of Weir).

The present disclosure exemplifies a reverse phase emulsion cationic acrylamides of an IV of 9 dl/g.

Experimental procedure A, data set 1 is similar to the procedure followed in Weir except that Weir does not suggest thickening of the treated suspension and further mixing of the thickened suspension in order to distribute the release polymer within the suspension. Nor does Weir suggest or carry out mechanical dewatering. One can assume Weir was not aware that the additional steps would provide an improvement in his filtration results as Weir does not make any reference to such steps. Although the results of Weir cannot be directly compared to the presently disclosed examples the results are

instructive in that Weir shows inferior filtration when using a single dose of reverse phase polymer (50% concentration).

In contrast to Weir, applicants have found a way to improve reverse phase dosing by including an additional thickening and mixing and compression dewatering steps.

Applicants bring to the examiner's attention that the results in present Table 1, in particular the comparative results of test procedure A, data set 1 and test procedure B, data set 3.

The test procedure A, data set 1 shows addition of a reverse phase cationic polymer but includes the additional steps of mixing of release polymer in the thickened sludge and mechanical dewatering. This method as presently claimed is compared to the method B which has no thickened sludge mixing step.

It is clear that the % cake solids for data set 1 is far superior to that shown in data set 3 and that the reason for the enhanced cake solids is the mixing of the thickened sludge as that is the only difference between the two data sets.

Data set 2 is also informative as this test uses an inverted polymer (0.25 w/v) not a reverse phase polymer and omits mixing of the thickened sludge step entirely. Clearly this method not according to the invention gives the worst cake solids %.

Thus the applicants believe the present claims to be unobvious in light of Weir and Winn. Further applicants have amended the claims to more closely reflect the showing.

To summarize:

- While Winn suggests the use of reverse phase polymers, he only suggests the use in a conventional manner, that is in inverted form. The combination of elements from Weir and Winn as claimed is highly selective picking and choosing from the two references without any direction or motivation from either reference to make the particular selections

- Weir's examples indicate he was not remotely aware that mixing of a thickened sludge would improve volume of filtrate. Examiner has noted that the polymers used in Weir are similar to those utilized in the present process. Although the polymers are similar, the results when

contrasted with those presently exemplified indicate that indeed the thickening step of the suspension wherein a release polymer is further mixed within the thickened sludge is important and gives unexpected improved cake solids.

- The contrast between present data sets 1 and 3, indicate that the mixing step for the thickened sewage sludge is key and lead to surprising results.
- And finally, the scope of the claims has been narrowed to reflect the scope of polymers exemplified.

In the event that minor amendments will further prosecution, applicants request that the examiner contact the undersigned representative.

Respectfully submitted,

Shiela A. Loggins

Ciba Specialty Chemicals Corporation
Patent Department
540 White Plains Road
P.O. Box 2005
Tarrytown, NY 10591-9005
(914) 785-2768
SAL\ 22357R1.doc

Shiela A. Loggins
Agent for Applicants
Reg. No. 56,221